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Illegitimacy of the Name Sorghum vulgare Persoon (Gramineae)

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Southern Methodist University

Because the three most recent American publications to deal with the nomenclature and taxonomy of the cultivated sorghums[1] continue to use the name Sorghum vulgare, it seems in order to explain briefly why the binomial cannot be retained.

Persoon (Syn. Pl. 1: 101 [1805]) based Sorghum vulgare on Holcus Sorghum Linnæus, 1753, and recognized two named varieties: bicolor (with query), based on Holcus bicolor Linnæus, 1771, and rubens, based on Holcus rubens Gaertner, 1791. Thus there were three older names in the rank of species. The earliest, Holcus Sorghum, cannot be transferred because it would make an inadmissible duplicate of the generic name [i.e., Sorghum Sorghum-Ed.]. The next oldest must be adopted, and the correct name for Sorghum vulgare as delimited by Persoon is therefore Sorghum bicolor (Linnæus) Moench, 1794. Persoon treated S. saccharatum as a distinct species, following Linnæus' 1753 treatment of it as Holcus saccharatus. (Contrary to the statement in the synonymy given by Hitchcock, Persoon did not treat this "as new," for he quotes a bit of Linnæus' description, explicitly crediting the words to "Lin.") If the sweet sorghums and grain sorghums are considered to belong to only one species, as is done by all three of the recent American authors mentioned above, then Holcus saccharatus Linnæus, 1753, should provide the earliest available specific name. But Linnæus confused matters by giving in 1763 (Sp. Pl. ed. 2: 1484-1485) a new and expanded description of this species, differing in several points from the original one of 1753, and obviously based on different material not seen by him earlier. I agree with the conclusion expressed in J. D. Snowden's "A Classification of the Cultivated Sorghums" (Kew Bull. 1935 no. 5: 221-285; see especially footnote on p. 234), that Holcus saccharatus Linnæus is a nomen confusum and should be abandoned, leaving Sorghum bicolor as the correct name for the combined species. Those who consider

[1] Hill, Albert F. The Nomenclature of the Cultivated Sorghums. Bot. Mus. (Harvard) Leafl. 4 no. 10: 173-180 (1937).
Bailey, L. H. Manual of Cultivated Plants, rev. ed. (1949).
Hitchcock, A. S. Manual of the Grasses of the U. S., 2nd ed. (1950).

Holcus saccharatus clearly and positively identifiable must employ the binomial Sorghum saccharatum (Linnæus) Moench, 1794. Snowden divided the group into numerous species and varieties, calling the sweet sorghums S. dochna (Forskål) Snowden. Even if all three of the original varieties of Sorghum vulgare are similarly treated as distinct species, Persoon's binomial cannot be used for any of them, since it was illegitimate when published, and other legitimate epithets are available.

No new combinations are proposed for the cultivated varieties, of which eight are listed by Bailey. As in the case of the cultivated Capsicum peppers (cf. Baileya 4: 81-83 [1956]), it is entirely possible to go on using the same names used by Bailey, designating convarieties, without authors. Those who prefer a more full and detailed treatment may follow that of Snowden's book, "The Cultivated Races of Sorghum" (London [1936]).

The Bailey Hortorium's card file of names of plants in cultivation, and of their sources in the horticultural trade and in botanical gardens, was started in 1932 by Dr. L. H. and Miss E. Z. Bailey and has been kept up to date ever since. This file and the catalogue collection which is its basis were described in the March, 1953, issue of "Baileya" (vol. 1, no. 1, pp. 12-14). Until very recently, only plants listed by Latin names (species, varieties, etc.) were accounted for, and no attempt was made to record sources of fancy- or vernacular-named plants. However, among the numerous requests continually received at the Hortorium, for information as to sources of particular plant materials, there are many concerned with clones, hybrids, and garden "strains" of plants distinguished only by fancy names. In an effort to make the records more complete, and the resultant services broader and more valuable, fancy-named cultivars will henceforth be recorded just as Latin-named plants have been, beginning with the new catalogues for 1957. A start has already been made, since a number of 1957 catalogues have now been received. It will be nearly a year, however before the whole field of horticulture can be adequately covered in this respect, for many 1957 catalogues, such as those listing peonies, bearded irises, spring-blooming bulbs, etc., will not be received here until next summer and autumn. We hope that eventually our file will enable us to satisfy nearly any request for sources of plant material, if that material is currently available in the trade.

W. J. D.

Notes on Cultivated Scrophulariaceae
4. Veronica

Gordon P. DeWolf, Jr.

Gardeners are likely to be a chronically disappointed lot. They are perpetually on the lookout for new plants - and frequently disappointed when they acquire them. Many people, after hearing a "rave" about a particular plant - and subsequently acquiring what they believe to be the plant in question - find that it is not what they expected. For this disappointment such people are inclined to blame the dealer or collector, seldom themselves, and almost never the original source of information.

We all know that, in order to make ourselves intelligible to one another, we have to use the same names for the same things. Thus, in our everyday life, every person has one, and only one, legal name, though it is possible to change that name, legally, if he can produce a good reason. We all know, also, that some people use assumed names, as actors in the motion pictures are wont to do, or as criminals do to conceal their identity.

In dealing with cultivated plant material, the horticulturist and botanist constantly encounter plants, too, passing under assumed names. The trouble may start when a truly named plant dies out and a stranger, unbeknownst to all, grows up behind the label - or the labels may, inadvertently, be switched. This not infrequently happens in public collections, and it is probably not unknown even in commercial establishments. In either case, the error is bound to be widely perpetuated.

There are three main ways whereby one can ascertain the identity of a plant growing in one's garden. One way is to check it in a horticultural work - a gardening dictionary or encyclopedia - or with something like Bailey's "Manual of Cultivated Plants." A second way, if one knows the nativity of the plant, is to search a published flora of the area concerned. Finally, one might submit a specimen to one of the large botanical establishments, or to an institution, like the Bailey Hortorium, which specializes in the study of cultivated plants.

Veronica is a good example of a genus in which there is much such nomenclatural confusion among the cultivated members. For one reason or another a great many plants in the trade in this country are listed under incorrect names. This very understandably

leads to all sorts of misunderstandings and disappointments. It seems to me that some attempt should be made to straighten things out.

There are reputed to be some 250 species in the genus Veronica as it is currently interpreted, though an unknown but probably large number of these names, with more intensive study, will likely prove to be synonyms. Though this figure does include several herbaceous species native in Australia, it does not include the 70 - 80 predominantly shrubby species, native in New Zealand and Patagonia, which constitute the genus Hebe. Some, at least, of these 250 species are doubtless insignificant variations which do not deserve the dignity of a specific epithet. Many of the species are weeds, or unattractive plants of little horticultural value. Several species, however, have some little charm or usefulness and are more or less commonly found in gardens.

In the last sixty years the genus has had quite a bit of study by (primarily) European students. Unfortunately, these studies are somewhat unconnected, and despite the pretentious title of one of them, there is no proper modern monograph of the genus. The individual studies have, however, clarified our understanding of a number of groups of species of horticultural importance, by circumscribing the individual taxa with precision and indicating the synonymy. Taken together, they enable one, not without some difficulty, to identify with reasonable surety most of the horticultural material. However, since they are nearly all written in the German language and published in European scientific periodicals, they are not readily available to the average American horticulturist.

Historically, the classification of the genus is a story of increasing complexity correlated with the increase in the number of known species. Linnæus in 1753 recognized some 27 species. He divided the genus into three groups on the basis of the character of the inflorescence. Thus, he had a group called "Spicatæ," a group "Corymbo-racemosæ," and one he called "Pedunculis unifloris." What I presume to be the first proper monograph of the genus was the "Monographia generis Veronicæ" of Karl Heinrich Emil Koch, published in Wurtemburg in 1833. This appears to have been his Ph. D. dissertation, printed, as was the custom, in a limited edition at the time of his formal academic examination. It appears to be rare (or unknown) in American libraries. I have not seen a copy.

In 1846, in the tenth volume of De Candolle's "Prodromus . . . ," there appeared a treatment of the Scrophulariaceæ by George Bentham. By this time the genus included about 160 species, including the shrubby Hebes. Bentham recognized 7 sections, which he based on a multitude of characters, both vegetative and sexual. In general, his groups of species are recognized as valid today, though the arrangement of the groups has been considerably changed. This treat-

ment was the basis for the next study of the genus, by Richard von Wettstein, published in 1891 in Engler and Prantl's "Die natürlichen Pflanzenfamilien."

In 1921 the late Francis W. Pennell published a paper entitled "Veronica in North and South America." In this paper Pennell established two important points. He definitely separated the generally shrubby and distinctly austral species into a distinct genus, Hebe. He explicitly divided the genus Veronica into two subgenera - one, Veronicella, characterized by a terminal inflorescence, the other, Euveronica[1], with the inflorescence borne on lateral branches and never terminating the main stem. Subsequent studies, mainly by European students, have resulted as noted above in a more precise delimitation of the species. These studies indicate, among other things, that a great many forms that have come into cultivation are not, in fact, worthy of specific status, and consequently many names familiar in horticulture are not now valid.

In any large genus, and in many small ones, the characters which botanists take for differentiation between species are likely to seem to be rather obscure and trivial ones to the horticulturist. Unfortunately, the characters useful to the horticulturist, while constant for a given clone or strain, are frequently not constant throughout the taxon as a whole. For examples, one might cite the many species with variable flower color, or differences in habit, pubescence, or leaf shape. Botanists attempt (though they are not completely successful) to select for particular mention in their studies characters which do not seem to vary appreciably within the taxon. Thus, in the genus Veronica, the botanical emphasis is on the kind of inflorescence and the shape of the seed-pod. In the following keys, compiled from the aforementioned monographs and modified on the basis of examination of herbarium material, I have endeavored to use these characters along with combinations of more obvious, even if less reliable, characters.

This key is in three parts. The genus is first divided into two subgenera on the basis of the position of the inflorescence. These may be further subdivided into several sections, groups of species which have many characters in common. Finally, each section is provided with a key to its constituents. A key of this sort is called "natural" because it attempts to key out together species which are believed to be related. In the case of a group which has had a great deal of genetical study, such a grouping of species may, indeed, indicate some sort of relationship. In the present case, however, the criteria are based only on gross morphology, and, though we may assume that some groups are natural, we have no objective proof that such is the case.

[1] According to the present rules of nomenclature ("The subgenus containing the type species of a generic name must bear that name unaltered"), subgenus Euveronica automatically becomes subgenus Veronica, and is so called in this article.

The nomenclature adopted here is based on the monograph of Römpp, published in the 50th Beiheft of Fedde's "Repertorium Specierum Novarum Regni Vegetabilis," dated 1928. I have made a few changes based on the International Code of Botanical Nomenclature, and on the studies of Pennell. I fear that not all of these names will be permanent, but this is about the best that can be done without a proper monograph of the genus.

Key to the Subgenera

I. Main stem terminating in an inflorescence, its flowers remote and axillary or densely crowded, in all cases the upper bracts, or floral leaves, are alternate; calyx 4-parted. . . . . Subgenus Veronicella (Fabricius) Pennell (p. 146)

II. Main stem never terminating in an inflorescence, the leaves and bracts opposite throughout and the flowers all in axillary racemes; calyx 4- or 5-parted. . . . . .Subgenus Veronica (p. 155)

Key to the Sections of the Subgenus Veronicella

A. Flowers solitary in the axils of the foliage leaves. . . . . .Section Alsinebe Römpp (p. 154)

AA. Flowers in more or less distinct racemes, generally dense-flowered, but sometimes interrupted.

B. Generally small plants, with creeping or ascending stems, or with basal rosettes; inflorescence generally loosely and shortly racemose. . . . . Section Veronicastrum Bentham (p. 146)

BB. Medium-sized to large plants, with erect or ascending stems from a perennial crown; inflorescence generally a long, dense raceme. . . . . .Section Pseudolysimachia Koch (p. 151)

Key to the Cultivated Species of Section Veronicastrum

1. Inflorescence an elongate raceme.

2. Pedicels as long as, or longer than, the capsule.

3. Leaves lanceolate to almost rotund, equally large to the base of the inflorescence.

4. Leaves thin, ovate to almost rotund, strongly toothed. . . . . .V. Ponæ Gouan

4. Leaves coriaceous, narrowly lanceolate to narrowly oval (cf. also V. saturejoides).

5. Plant pubescent; leaves short-petioled throughout; flowers pink or white. . . . . .V. fruticulosa Linnæus

5. Plant pubescent or glabrous; lower leaves short-petioled, upper leaves sessile; flowers deep blue. . . . V. fruticans Jacquin

3. Basal leaves lanceolate or elliptic, larger, forming a rosette, leaves of the flowering stems reduced.

6. Leaves entire-margined or only weakly toothed. V. gentianoides Vahl

6. Leaves strongly toothed. . . . . V. senanensis Maximowicz

2. Pedicels shorter than the capsule.
   7. Basal leaves forming a rosette. . . . . V. bellidioides Linnæus
   7. Basal leaves not forming a rosette.
      8. Style less than 1/2 as long as the capsule. . . . . V. alpina Linnæus
      8. Style longer than the capsule. . . . . .V. Cusickii A. Gray
1. Inflorescence a compressed or almost capitate raceme.
   9. Style not more than 1/2 as long as the capsule. . . . . V. erinoides Boissier
   9. Style about as long as the capsule, or longer.
      10. Flowers rose-colored.
         11. Leaves elliptic to ovate. . . . . V. Nummularia Gouan
         11. Leaves linear, with a revolute margin. . . . V. cæspitosa Boissier
      10. Flowers blue or violet.
         12. Style as long as the capsule; leaves distinctly toothed. . . . . V. Nummularia Gouan
         12. Style 1 and 1/2 times as long as the capsule; leaves weakly toothed. . . . . .V. saturejoides Visiani

The section Veronicastrum is recognized by the terminal inflorescences and the strongly compressed fruits. In general, the plants are small and are most suitable for use in the rock garden. The species vary considerably in habit.

Veronica gentianoides is the name given to a species native in the Caucasus, Crimea, and Asia Minor. It was first made known to science as the result of J. P. Tournefort's collecting expedition to the Levant in 1700 - 1702. Despite Tournefort's description, the plant was unknown to Linnæus. In 1761, Pehr Forskål, a pupil of Linnæus' who had been studying Oriental languages in Copenhagen, joined an expedition that was being sent out to explore Arabia. Forskål died in Arabia in 1763, at the age of 31. His collections and manuscripts, however, were sent back to Copenhagen. His own studies were published posthumously, in 1775, as a "Flora Ægyptiaco - arabica" (Flora of Egypt and Arabia). His unstudied collections were retained at Copenhagen and in 1790 Martin Vahl, Professor of Botany there, published on the plants. It is from this last date that the name Veronica gentianoides dates.

Veronica gentianoides varies considerably in size. It is a rosette-plant, with a single, erect spike of pale blue flowers from each crown. In small plants the flowering stems may be no more than 5 cm. tall, while large plants may be up to a meter tall. No matter what the size of the plant, the size of the flower remains at about 1 cm. in diameter. Hence, the smaller the plant, the more showy it becomes. Forms with variegated foliage have also been reported.

Veronica Ponæ, a species which grows naturally in the mountains of southern Europe, from the Pyrenees to northern Italy, was first described by Giovanni Pona, a Veronese pharmacist, in his

"Plantae seu simplicia, ut vocant, quae in Baldo monte et in via ab Verona ad Baldum reperiuntur" (Plants or Simples which are found on Mt. Baldo or on the road from Verona to Baldo). The species was studied and given its present name according to the modern system in 1773 by Antoine Gouan, Professor in the famous botanical school at the University of Montpelier. It was renamed V. Gouanii by mistake in 1822. This latter name has gained some currency due to its use, in error, by Sampson Clay in "The Present Day Rock Garden." It is, however, only a synonym of Gouan's name and should not be used. This species and the next two species in this section (Veronicastrum) are small plants with thin subterranean rhizomes. The erect, annual stems have no rosette, the foliage leaves are distributed evenly in the lower and middle part, and the inflorescence is more or less distinct.

Veronica senanensis was described in 1888 by Carl Maximowicz, then Chief Botanist at the Botanical Garden and Director of the Museum of the Academy of Sciences in St. Petersburg (now Leningrad). This is a small plant with erect stems generally 12 - 17 cm. tall. The pale purple flowers, which generally number about 10, are about 1 cm. wide and are loosely borne in the terminal raceme. This is a plant of rocky alpine situations in central Honshu, Japan. It likes full sun.

Veronica alpina, so named by Linnæus, is one of those species with many aliases. At various times it has been misidentified as V. Teucrium, V. pumila, V. carnea, V. Wormskioldii, and V. nivalis, to mention only a few names. It is quite generally distributed through the mountains of the North Temperate Zone in both the Old and New World. It is not a very spectacular species; the stems grow 5 - 25 cm. tall but the flowers are only 5 - 7 mm. in diameter, and "blue-lilac" in color. Farrer had not much use for it, and I have seen nothing in the herbarium that would tempt me to question his judgment.

Veronica Cusickii is a somewhat shorter (it grows to 20 cm. tall), stouter, oval-leaved relative of V. alpina, found in the mountains of the northwestern part of this country. So far as the gardener is concerned, this seems to be a slight improvement over V. alpina.

Veronica bellidioides is a species widely distributed in the mountains of southern and central Europe. It was known to Caspar Bauhin, Professor of Botany at Basel and the author of the "Pinax Theatri Botanici," a very useful nomenclator of pre-Linnean specific names, in 1623. Its present name dates from Linnæus. Though this species seems not to be widely cultivated, yet it is deserving of attention. Prostrate, woody stems terminate in rosettes of gray-pubescent leaves. From these, in the middle of summer, rise erect stalks 5 - 25 cm. tall bearing 5 - 10 blue flowers which are

Fig. 42. Veronica fruticans.

6 - 9 mm. broad. The smaller forms, particularly, should be valuable in the rock garden.

Veronica fruticulosa and V. fruticans are two apparently very similar species. The former, native in southern Europe from the Pyrennees to the Carpathians, has pink flowers and a glandular pubescence on the calyx, capsule, and pedicels. The latter has a more westerly and northerly distribution, flourishing in nature from the Pyrennees and Corsica to Greenland and Finland. This has blue flowers and no glandular pubescence, though it may be slightly hairy. This has been frequently called V. saxatilis.

The next group of species, Veronica erinoides, V. cæspitosa, V. saturejoides, and V. Nummularia, has at least a superficial resemblance to the Veronica fruticulosa - V. fruticans alliance. These species differ, however, most conspicuously in leaf shape, which is oval to obovate, or linear, as contrasted with lanceolate. They are all prostrate shrublets.

Veronica ericoides is a name in the trade. So far as I know it is a name without botanical standing. I suspect that ericoides originated as a misprint for erinoides, the epithet for a species native in the mountains of Greece. This species seems to be very little known botanically and I doubt that it is in cultivation.

Veronica Nummularia is a tiny creeping species, de-

Fig. 43. Veronica grandis.

scribed by Gouan from Mt. Perdu in the Pyrennees. The leaves are rotund, and so closely set as to appear almost imbricate. Two color forms are said to exist, one with pink, the other with blue flowers.

Veronica cæspitosa was described by Edmund Boissier in 1844. It is apparently rather widely distributed in northern Asia Minor. Each flowering stem bears 1 - 4 "large" (about 1 cm. broad) flowers. The leaves are linear.

Veronica saturejoides is a species native in Dalmatia. Like the others of this group it is a prostrate shrublet. It has dark blue flowers and elliptic to obovate leaves.

At least some of the forms included in the section Pseudolysimachia probably are familiar to most gardeners. Veronica longifolia and V. spuria are widely cultivated in the herbaceous border - and under a variety of names. They are free-flowering perennials useful because they bloom in midsummer. Several other species are sometimes cultivated, and each has its value. They all form clumps of densely entwined subterranean rhizomes from which arise erect, annual herbaceous branches. They are a very natural group, and, knowing one, one can readily recognize all the others, but they are a group difficult to indicate precisely in a key. Whatever the difficulty, however, the following key attempts to separate them.

Key to the Cultivated Species of Section Pseudolysimachia

1. Flowers sessile, or with the pedicels to 2 mm. long.
   2. Plant shortly pubescent or glabrous. . . . . V. spicata Linnæus
   2. Plant heavily white-pubescent. . . . . V. incana Linnæus
1. Flowers with pedicels more than 2 mm. long.
   3. Leaf-base rounded or cordate.
      4. Leaf-base rounded, leaf-margin singly or doubly sharp-toothed.
         5. Leaves distinctly petiolate. . . . . V. longifolia Linnæus
         5. Leaves, at least the lower ones, sessile. . V. Komarovii Monjuschko
      4. Leaf-base cordate, margin irregularly toothed. . . . . V. grandis Fischer & Sprengel
   3. Leaf-base cuneate.
      6. Leaves pinnatifid. . . . . V. pinnata Linnæus
      6. Leaves only toothed. . . . . V. spuria Linnæus

Veronica longifolia is, beyond doubt, the species most commonly cultivated in this country. It is a variable taxon, and a good many forms have received the dignity of specific names. Also, it has not uncommonly been confused with other, distinct, species in this section of the genus. The following epithets are some of those

Fig. 44. Veronica grandis var. holophylla.

which have been applied: arguta, austriaca, carnea, elatior, exaltata, excelsa, flexuosa, glabra, grandis, hybrida, incana, Keutzii, Koenitzeri, macrocarpa, maritima, orchidea, saturejoides, scutellata, sibirica, spicata, spuria. Veronica longifolia, as befits a variable taxon, is distributed widely in nature. It is primarily a northern plant, growing naturally from Germany to northern Scandinavia and eastward to Japan. In the eastern United States it is sometimes found as an escape from cultivation. The epithet maritima - which was based on a form with deeply toothed narrow leaves (almost identical with the form that has been called exaltata) - is one that has been frequently used in this country during the past 30 years.

The name Veronica Komarovii is in the trade and in the botanical literature. It appears to be a taxon closely related to V. longifolia. It is most readily characterized by its sessile leaves - though how it differs from the taxon called V. longifolia var. subsessilis, I do not know. It is recorded from southern Siberia and Japan. Its certain presence in cultivation in this country seems to me to be questionable.

Veronica grandis is perhaps better known in the trade as V. Bachofenii or V. Michauxii, this last a wild misidentification. Though variable in leaf-width, this species is readily identifiable by the cordate leaf-bases. I have seen one plant of what may be called Veronica grandis var. holophylla Nakai. It differs from V. grandis by the gleaming coriaceous nature of the broad, almost cordate leaves. How widespread in cultivation it may be, I do not know.

Veronica pinnata is an Asiatic species which is apparently not well known botanically, at least not in western Europe and America. The name is in the trade, but I suspect that the species is not. Plants so named might, however, be some form of Veronica austriaca.

Veronica spuria also masquerades as V. paniculata, V. amethystina, and V. elegans. It is readily distinguished from V. longifolia, which it resembles, by the cuneate leaf-bases. Its range is similar to that of V. longifolia, but more southerly, from France to Japan.

The two species with sessile or nearly sessile flowers differ from the other species of the section in habit also, their rootstocks being somewhat stout and rather widely creeping. The erect branches apparently overwinter as short erect shoots which give the impression of rosettes. The flowering branches that they form in midsummer are slim and generally 10 - 40 (-70) cm. tall.

Veronica spicata has a good many aliases, some of the epithets encountered in the trade being: australis, corymbosa, crassifolia, elegans, hybrida, incana, montana, orchidea, Waldsteiniana. It is

a widely distributed species, being found in western, central, and northern Europe, and eastward to Japan. It has also escaped from cultivation in the eastern part of the United States. The smaller-statured alpine strains are perhaps more attractive and useful than the taller-growing lowland forms.

Veronica incana, which has also been called V. amythystea, V. cinerea, and V. candidissima, is essentially similar in appearance to the last, but is heavily covered with a white or whitish pubescence. It is distributed in nature from north-central Europe to Japan.

Most, or all, of the species of this section seem to be able to hybridize among themselves - though material which I have seen does not lead me to think that this has produced much complication in the material cultivated in this country. It is quite possible, however, that careful hybridization might produce some excellent horticultural material.

The section Alsinebe consists of small, weedy, frequently creeping and frequently annual species. With the exception of Veronica filiformis, which has relatively large flowers and is becoming common in this country as a weed of lawns, none of the species of this section seem to have much to commend them as garden subjects. The following key attempts to separate the species which are reputed to be in the trade in this country.

Key to the Cultivated Species of Section Alsinebe

1. Pedicels about as long as the bracts. . . . . V. serpyllifolia Linnæus
1. Pedicels 2 - 5 times as long as the bracts.
   2. Leaf-bases cuneate. . . . . V. telephiifolia Vahl
   2. Leaf-bases truncate or cordate.
      3. Flowers borne in distinct inflorescences, the leaves therein reduced to bracts.
         4. Plants more or less hairy, but not glandular-pubescent. . . . . .V. glauca Sibthorp and Smith
         4. Plants glandular-pubescent, at least on the inflorescence-axis.
            5. Whole plant glandular-pubescent. . . . . V. peloponnesica Boissier
            5. Only the inflorescence-axis and pedicels glandular-pubescent. . . . . V. Chaubardii Boissier & Reuter
      3. Flowers borne in the axils of unmodified foliage leaves.
         6. Leaves rotund, about 5-7 mm. wide. . . . . V. filiformis Smith
         6. Leaves ovate to elliptic, about 1 cm. wide. . . . . .V. Tournefortii C. C. Gmelin

Veronica serpyllifolia might be mistaken for V. alpina, with which it agrees in general size, in leaf shape, and leaf consistency. It is most readily distinguished, however, by its much elongated inflorescence and the superficial, wide-creeping rhizome.

Veronica telephiifolia is similar in appearance, though it differs in that the erect or ascending stems branch freely and the leaves are rotund. I have seen no material of this, either native or cultivated, and I suspect that the reports of this in the trade may be in error.

Of Veronica glauca, V. peloponnesica, and V. Chaubardii, I have seen only a single wild specimen of V. glauca. These three species do not seem to be cultivated in England, either. I know nothing more about them than what is indicated in the key. I doubt that these plants are in the trade, appearance of names notwithstanding.

Veronica filiformis and V. Tournefortii are two similar weeds - though the first-named has a delicacy which might find it a place in the moist rock garden. Veronica Tournefortii grows naturally through much of Europe and western Asia. It is commonly found as a weed in temperate regions elsewhere. Veronica filiformis, on the other hand, in nature seems to be confined to the mountains of Asia Minor.

The key to the subgenus Veronica given below is much more unsatisfactory than the keys to the species of the subgenus Veronicella. This reflects a lack of material for study. Though the names of a considerable number of species of this subgenus are listed in the trade in this country, many of these species are represented by few or no specimens of either wild or cultivated material in the Bailey Hortorium herbarium. The key, then, is based to a rather large extent upon published descriptions, and, consequently, subject to errors of misinterpretation. It is offered for whatever usefulness it may have - the hope being that a poor key will be better than none. Also, I have not adopted a division of the subgenus into sections because published accounts conflict, one with another, and lack of material precludes my making an independent judgment. Finally, discussion of individual species will be limited to those of which I have first-hand knowledge.

Key to Cultivated Species of Subgenus Veronica

1. Plants glandular-pubescent throughout. . . . . V. Michauxii Lamarck
1. Plants glabrous or pubescent, but never glandular-pubescent throughout.
   2. Calyx 5-parted, the fifth (posterior) tooth somewhat reduced.
      3. Capsule longer than broad, with the base rounded.
         4. Leaves entire to dentate.
            5. Plants with prostrate to ascending stems and branches; corolla 5-8[-11] mm. in diameter. . . . . V. prostrata Linnæus

5. Plants with erect or ascending stems, corolla 8 - 17 mm. in diameter.

6. Leaves narrowly lanceolate to linear-lanceolate. . . . . .V. austriaca Linnæus ssp. dentata (Schmidt) Watzl

6. Leaves ovate to lanceolate.

7. Leaves small, 6 - 28 mm. long and 2 - 20 mm. wide; capsule pilose. . . . . .V. latifolia Linnæus ssp. Orsiniana (Tenore) DeWolf [1]

7. Leaves medium-sized to large, 20 - 68 mm. long and 6 - 45 mm. wide.

8. Leaves glabrous to pubescent; racemes elongate; capsule glabrous or pubescent. . . . . V. latifolia Linnæus ssp. pseudochamaedrys (Jacquin) DeWolf [2]

8. Leaves pubescent to tomentose; racemes compact; capsule glabrous. . . . . .V. latifolia Linnæus ssp. crinita (Kitaibel) DeWolf [3]

4. Leaves divided. . . . . V. austriaca Linnæus ssp. Jacquinii (Baumgarten) Maly

3. Capsule broader than long, with the base cuneate.

9. Leaves simple, more or less dentate. . . . . V. orientalis P. Miller

9. Leaves pinnately divided or parted.

10. Flowers pink or pale blue, pedicels 1/2 - 2 times as long as the calyx. . . . . V. multifida Linnæus

10. Flowers azure-blue, pedicels 2 - 3 times as long as the calyx. . . . . .V. armena Boissier

2. Calyx 4-parted.

11. Racemes stiffly erect from a prostrate, creeping stem.

12. Leaf-bases rounded. . . . . V. Onei Franchet & Savatier

12. Leaf-bases cuneate.

13. Flowers 6-7 mm. in diameter. . . . . V. officinalis Linnæus

13. Flowers about 10 mm. in diameter. . . . . .V. Allionii Villars

11. Racemes ascending from the apical portion of a prostrate, ascending, or erect stem.

14. Pedicels, in mature fruit, about as long as the calyx-lobes or a little longer or shorter.

15. Stems creeping, with ascending branches; flowers closely spaced in the inflorescence.

16. Calyx longer than the capsule. . . . . V. polifolia Bentham

[1] Veronica latifolia L. ssp. Orsiniana (Tenore) status novus.
V. Orsiniana Tenore, Fl. Neap. Prod. App. v: 4 (1826).

[2] Veronica latifolia L. ssp. pseudochamaedrys (Jacquin) status novus.
V. pseudochamaedrys Jacquin, Fl. Aust. I: 37, t. 60 (1773).

[3] Veronica latifolia L. ssp. crinita (Kitaibel) status novus.
V. crinita Kitaibel in Schultes, Oestr. Fl. ed. 1, I: 27 (1794).

16. Calyx about as long as or shorter than the capsule.
    17. Leaves strongly toothed or divided. . . . . .V. pectinata Linnæus
    17. Leaves entire or only weakly toothed. . . . . .V. thymifolia Sibthorp & Smith
15. Stems erect or ascending from a subterranean rhizome; flowers widely spaced in the inflorescence. . . . . .V. Chamaedrys Linnæus
14. Pedicels, in mature fruit, 2 or more times longer than the calyx-lobes.
    18. Calyx about 1/2 as long as the mature capsule. . . . . .V. Baumgartenii Roemer & Schultes
    18. Calyx as long as or longer than the capsule.
        19. Leaves long-petiolate. . . . . .V. peduncularis Bieberstein
        19. Leaves sessile or short-petiolate.
            20. Flowers white with blue lines. . . . . V. caucasica Bieberstein
            20. Flowers blue or pink. . . . . .V. petraea Steven

Veronica Michauxii is a species of which very little seems to be known. I have seen no material of it. Despite the appearance of the name in the trade, I doubt that the true thing is in cultivation. From the description, it is a creeping thing more or less completely covered with glandular hairs. Other species of this subgenus may have glandular pubescence on inflorescence-axis and/or pedicels, but not generally distributed as here.

Veronica prostrata, V. austriaca, and V. latifolia are three extremely variable but closely related species. A great many names have been coined for the forms here embraced by these three names. I suspect that some sort of genetic irregularity and/or breeding promiscuity has contributed to the variability of the individuals included here. Indeed, careful experimental work would doubtless be rewarding both botanically and horticulturally.

The name Veronica latifolia is not one that has currency in Europe, though the species is native there. European students prefer the name V. Teucrium. Now V. Teucrium is a name which was used almost exclusively for this taxon for more than a century. It is a name published by Linnæus in the second edition of the "Species Plantarum." It is a name, however, which seems to have been published in error, for he had already named another form of the same taxon V. latifolia in the first edition of the "Species Plantarum." The late Francis W. Pennell pointed out this error in 1921, and his interpretation, here used, has been followed by American students. In Europe, however, the other name, V. Teucrium, seems still to be firmly entrenched.

As befits a variable species, Veronica latifolia has a rather complex infraspecific classification. While many of the minor categories seem to be not too clearly defined, three subspecies may conveniently be recognized.

Veronica latifolia ssp. pseudochamaedrys is the commonest form of the species in cultivation - at least so far as our herbarium records show. In nature it ranges from Spain, France, and Germany eastward, becoming increasingly common in central and eastern Europe. It is also the largest-growing form, some plants reaching 1 meter in height. Cultivated forms, however, seem to be of a lower stature.

Veronica latifolia ssp. crinita is smaller in vegetative parts, and more strongly pubescent than the last. It is native in Hungary and the Balkans.

Veronica latifolia ssp. Orsiniana is a very small form, the stem decumbent at the base and the inflorescence short and compact. It is readily separable from the ssp. crinita by its decumbent base and pilose capsules. It is native primarily in southwestern Europe, though collections are recorded from Macedonia and Turkey.

Veronica austriaca is likewise a variable taxon. The form that our records show to be most commonly in cultivation in this country is ssp. Jacquinii, native primarily in the Balkans, with deeply divided leaves. The segments of the divisions are very narrow. The ssp. dentata var. bihariensis, native from Austria to the Crimea, and apparently occasionally cultivated in this country, has very deeply toothed, almost divided leaves, but the segments are quite coarse.

Finally, of this group, there is Veronica prostrata. In nature, this species, like V. latifolia, is distributed from Spain, France, and Germany eastward through central Europe into southern Russia. It is somewhat variable in height, in leaf shape, and pubescence, but the habit is unmistakable. This is, I believe, the common Veronica "rupestris" or Veronica cv. 'Heavenly Blue.' While many of the forms which are commonly grown are prostrate and compact, larger and more diffuse forms sometimes appear - sometimes under the same names.

Fig. 45. Veronica prostrata.

Veronica orientalis is the name for a species

of this group, native in the mountains of southern Russian and ranging southward to Mesopotamia and Persia. The name has, however, in the past been misapplied to Veronica austriaca.

Veronica multifida, likewise, is a perfectly good taxon in its own right, but the name has been erroneously applied to Veronica austriaca.

Veronica armena is a low, prostrate mound-former from the mountains of Armenia. I have seen no wild material of this species, but the cultivated material which I have seen would lead me to think that it is not uncommon in cultivation.

Veronica Onei and V. Allionii are apparently quite similar to V. officinalis, the common "Speedwell." Veronica Onei, a native of Japan, seems to be little known botanically or horticulturally. Since V. Allionii is reputed to differ primarily from V. officinalis in the size of the flowers, it would seem to me to be at best a geographical race. It is here treated as a full species in deference to custom.

Veronica polifolia, V. pectinata, and V. thymifolia are three apparently similar species native in the mountains of Greece and Asia Minor. I have seen no authentic wild material of any of the species, and cultivated material only of what purports to be V. pectinata.

Veronica Baumgartenii, of which I have seen only a single, wild, specimen, appears to be a rather insignificant plant, native in the mountains of central Europe.

Veronica Chamaedrys seems to be essentially similar to Veronica latifolia, but differs in having a 4-parted (not 5-parted) calyx and a looser, more open raceme.

Veronica peduncularis is a rather insignificant, whitish- or bluish-flowered thing, similar to, but smaller than, V. Chamaedrys, native in the mountains of eastern Europe and Asia Minor.

Veronica caucasica and V. petraea are the names of two species native in the Caucasus. They are apparently similar to V. peduncularis. I have seen no material of either of these.

Fig. 46. Opithandra primuloides. Redrawn, in part, from Curtis's Botanical Magazine, vol. 166, plate 47 (1949).

An Independent Genus for Oreocharis primuloides

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Only two members of the family Gesneriaceæ are native to Japan. One is the well-known Conandron ramondioides, the other is the plant currently called Oreocharis primuloides. When it is realized that the latter has at various times also been placed in the genera Boea, Didymocarpus, and Chirita it will be appreciated that its position is somewhat uncertain.

In 1949 (see Curtis's Botanical Magazine N.S. tab. 47) I ventured the suggestion that it would eventually need to be ranked as an independent genus, but the time did not seem appropriate as certain questions could not be decisively answered. Since the writing of that article a fine batch of these plants has been grown at the Royal Botanic Garden, Edinburgh, from seed kindly supplied by Dr. J. Ohwi of Tokyo. These plants showed certain differences from the old stock that had been in cultivation for some years, but they also showed a fair amount of variation amongst themselves. Dr. H. Hara visited Edinburgh in 1954 and I discussed the problem with him, and on his return to Japan he was good enough to examine the herbarium material available there. As expected, he found that he was unable to recognize more than a single entity and I am accordingly continuing to refer all the material to the one variable species.

Examination of a large number of flowers has now shown that possession of only two fertile stamens is a completely consistent character and one can only assume that the illustration in "Somoku Dzusetsu" (which shows 4 fertile stamens) is in error. All the other species of Oreocharis have four fertile stamens, but there are, of course, numerous other genera in the family which have only two. However, in Oreocharis primuloides the fertile stamens are the postero-lateral pair; in nearly all the other genera with two fertile stamens they are the antero-lateral ones. In fact, it seems that the only diandrous genera of Gesneriaceæ in which the postero-lateral stamens are the fertile ones are Epithema, Sarmienta and Sepikæa; each of these belongs to a different group of the family and none is closely allied to Oreocharis primuloides.

The sterilization of the antero-lateral stamens while the postero-laterals remain fertile is thus a very distinctive characteristic and justifies the segregation of Oreocharis primuloides into an independent genus. Actually, this plant does not stand quite alone, for three or four other species have been found in the herbarium which share the same feature. However, they are not in cultivation, and discussion of them is reserved for a more detailed paper on this new genus which it is hoped will be published shortly in "Notes from the Royal Botanic Garden, Edinburgh." The objective of the present note is simply the establishment of the genus and the publication of the new combination for Oreocharis primuloides.

Opithandra B. L. Burtt, gen. nov., adhuc vel cum Oreocharide Benth., vel cum Didymocarpo Wall., vel cum Chirita D. Don confusa; a primo staminibus fertilibus duobus tantum, ab aliis staminibus fertilibus postico-lateralibus, et filamentis rectis et antherum thecis parallelibus rimis parallelibus dehiscentibus recedit.

Opithandra primuloides (Miquel) B. L. Burtt, comb. nov.

Syn.: Boea primuloides Miquel in Ann. Mus. Lugd. Bat. iii, 190 (1807); Iinuma, Somoku Dzusetsu, ed. 2, xi, t. 70 (1874).
Didymocarpus primuloides (Miq.) Maxim. in Bull. Acad. Petrop. xix, 535 (1874) et Mél. Biol. ix, 369 (1874); Franchet & Savatier, Fl. Jap. i, 328 (1875); Yatabe, Ic. Fl. Jap. i (3), tab. 46 (1893).
Oreocharis primuloides (Miq.) C. B. Clarke in DC. Mon. Phan. v (1), 63 (1883); Léveillé in Fedde, Rep. Sp. Nov. ix, 330 (1911); Iinuma, Somoku Dzusetsu, ed. Makino, xi, t. 70 (1912); Makino, Ind. Fl. Jap. ii, 577 (1912); Burtt in Curtis, Bot. Mag. N.S. tab. 47 (1949).
Chirita primuloides (Miq.) Ohwi in Jour. Jap. Bot. xii, 662 (1936).

In view of the increasing interest in this country in better cultivars of the common shrubby cinquefoil, Potentilla fruticosa, nurserymen and other specialists should know of an accounting by H. Dieterich in "Deutsche Baumschule" (vol. 8, pp. 273-276, October 1956) of the 23 sorts grown in Germany. A good description (in German) is given for each, and in many instances comparisons are made between closely related cultivars. Wherever known, the originator of the cultivar is given, together with year of introduction.

G. H. M. L.

A confusion in African Violets

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In 1947 I applied the name Saintpaulia diplotricha (see Gard. Chron. 3 ser. cxxii, 23: 19 July 1947) to a cultivated plant that had been long passing as S. kewensis C. B. Clarke. However, on the usually sound principle that a new species should be based, whenever possible, on a wild specimen, Buchwald 149 from the Usambara Mountains was designated as the type. This herbarium specimen agreed with the cultivated plant in being a species with rosette habit and hairs of two distinct lengths on the upper surface of the leaf; the fruit is cylindric and 1-1.3 cm. long. Those were the features by which the species S. diplotricha was chiefly characterized.

Knowledge of the genus Saintpaulia is, however, expanding rapidly. Further introductions from East Africa show that the indumentum of the leaves requires even closer study. It is not sufficient to distinguish between long hairs on the one hand and a mixture of long and short on the other. The double indumentum may be of two kinds. Some plants have longish spreading hairs on the upper surface of the leaf, and between the long hairs a dense but inconspicuous covering of very short erect hairs. The latter may be difficult to see when looked at vertically as they are quite translucent; they are best seen if a cut edge of the leaf is viewed horizontally. In other plants the long hairs are loosely appressed and the short hairs more strongly so - in fact they are curved over so that the tip of the hair touches the leaf surface It now becomes evident, too, that these differences in hairy covering are associated with other differences: the plant with erect hairs has rather thickish, but softer, purplish leaves in comparison with the thinner, but firmer, green leaves of the plant with appressed hairs. The latter represents the species that has long been in cultivation. In herbarium specimens hairs tend to be artificially appressed but careful re-examination of the type specimen of S. diplotricha shows that the short hairs are still characteristically erect, and it also appears to have had purplish leaves. There is no doubt that it belongs to the other, erect-haired type. This has now been introduced into cultivation and lays rightful claim to the name S. diplotricha.

As a consequence, we must unfortunately make another change in the name of the long-cultivated plant with appressed hairs and it is now proposed to call it S. confusa.

Since 1947 there has become available a number of wild-collected herbarium specimens which seem to be referable to this species. But it would be foolish not to learn the lesson of the mistake that now has to be corrected. Saintpaulia confusa is therefore based on the cultivated plant. Fuller descriptions of both species will be included in a general review of Saintpaulia now in preparation.

Saintpaulia confusa B. L. Burtt, sp. nov. indumento foliorum S. magungensi Roberts et S. amaniensi Roberts similis sed foliis congestis habitu rosulato recedit. A S. diplotricha B. L. Burtt, quacum adhuc confusa, pilis brevibus in pagina superiore foliorum appressis nec erectis et foliis viridibus tenuioribus sed firmioribus distinguitur.

Typus speciei: planta in hort. reg. bot. Kew: anno 1947 culta (holotype: Edinburgh; isotypes: Kew, Bailey Hortorium).

Foremost among the genera of American plants whose identities and relationships had become muddled and confused through centuries of cultivation, even before the discovery of this continent by white men, are the squashes and pumpkins. Of the four commonly cultivated species, that known as Cucurbita mixta or C. argyrosperma may be the most confused. In a recent article in the "Bulletin of the Torrey Botanical Club" (vol. 83, p. 253-260, July 1956), Hugh Cutler and Thomas Whitaker conclude that these two names represent a single species, C. mixta, composed of three well-defined variants distinguished by seed types: 'Green Striped Cushaw', 'Taos', and 'Silverseed'. All of these are found in Mexican gardens. Belonging to the first type are such cultivars, also, as 'Tennessee Sweet Potato', 'White Cushaw', and 'Japanese Pie'. The 'Silverseed Gourd' belongs to the last variant, and is distinguished by the conspicuous broad silver band around the edge of its seed.

G. H. M. L.

The Cultivated Hydrangeas

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Hydrangea is a genus of woody plants which has been placed in the Saxifragaceae. However, Hutchinson (1926) considered the woody members of this family (Philadelphus, Schizophragma, Decumaria, Pileostegia, and other genera related to Hydrangea) to constitute the Hydrangeaceae. Most members of Hydrangea are upright shrubs, although a few are climbers. The leaves are opposite and the flowers are borne in flat-topped or rounded clusters, except for two species in which the flower-clusters are conical. In most species the clusters are made up of two kinds of flowers, one of which is small and fertile, the other large and sterile. The sterile flowers, few in number, occur at the periphery of the cluster of numerous fertile flowers, or, rarely, the inflorescence may consist entirely of the larger and more showy sterile flowers. This latter condition occurs spontaneously in the wild in certain species such as H. macrophylla, H. paniculata, and H. arborescens. Plants of these species in which this abnormal condition has occurred have been selected for cultivation because of their conspicuous and showy inflorescences.

The conspicuous part of the sterile flower consists of the much enlarged calyx. A similar type of sterile flower occurs in Schizophragma and in certain other genera related to Hydrangea. However, in Schizophragma the sterile flower is made up of a single enlarged calyx-lobe which has developed a leaf-like shape. The sterile flowers of Hydrangea are reminiscent of those in some species of Viburnum, but in this latter genus the sterile flowers consist of enlarged petals.

The name Hydrangea was first used by Gronovius in the "Flora Virginica" in 1739. Gronovius gave this name to a plant collected in Virginia by John Clayton in 1734. Clayton, who has been called an "eminent botanist and physician," held for 51 years the office of Prothonotary of Gloucester County, Virginia, an office which apparently gave him time to make botanical excursions throughout Virginia. His collecting and writing led him into correspondence with the two Dutchmen, Jan F. and Lawrence Gronovius, the result of which was the publication of the "Flora Virginica" based on Clayton's collections.

Linnaeus, in describing Hydrangea arborescens in the "Species Plantarum" in 1753, adopted the generic name used earlier by Gronovius. This species of Hydrangea was the first to be introduced into cultivation in Europe. It was brought to England in 1736 but did not attain any great popularity, since its inflorescences have only a few sterile flowers or none at all and as a consequence are rather dull in appearance.

The next hydrangea to be introduced into England was Hydrangea macrophylla, which was imported from China by Sir Joseph Banks in 1789. This plant, which was considered to be a great curiosity when first seen in England, was destined to become one of our most popular garden and florists' plants. It was named H. hortensis by Sir James E. Smith shortly after its importation, but this name had been superseded by an earlier one published in 1784 in the "Flora Japonica" by the Swedish botanist, Carl Thunberg, who collected the plant in Japan. Thunberg placed the plant which he collected in the genus Viburnum and his name for it, V. macrophyllum, was overlooked for a number of years. Seringe, in 1815, writing in De Candolle's "Prodromus" on the species of Hydrangea known to that time, transfered Thunberg's Viburnum macrophyllum to Hydrangea.

The genus Hydrangea has a wide geographical distribution in eastern Asia, eastern North America, and Central and South America. Fairly abundant collections have been made of it, both for botanical and horticultural purposes, and these have provided adequate material for a recent monographic study. One of the conclusions which resulted from this study was that the amount of variation within the genus is limited to only a few floral and vegetative characters. These pertain to: habit, whether erect or scandent; foliage, whether persistent ("evergreen") and coriaceous or deciduous and chartaceous; floral bracts, whether broadly ovate and enveloping the unopened inflorescence or lanceolate and only partly covering the unopened inflorescence; shape of the inflorescence, whether conical or flat-topped; position of the ovary, whether inferior or half-inferior. Such characters form series in which there are well-defined breaks and, of course, individuals between these gaps or breaks constitute the species. The predominant flower color is white, although these white flowers are often tinged with pink or purple, and in a few species the flowers are pink or blue.

Within Hydrangea there are twenty-three species, of which nine occur in eastern Asia, two in the eastern United States, eleven in Central and South America, and one in western Mexico. Nine species are cultivated and, of these, six are Asiatic, two are North American, and one South American. One of the valuable features of hydrangeas as garden plants is their late flowering. Their seasonal spread of flowering extends from July through September and even into October in areas with mild climates. Hydrangeas in their native habitats are woodland plants and, therefore, in cultivation they must be grown in places which simulate a wooded or forested area and which are not too dry or too hot and sunny.

Key to the Cultivated Species of Hydrangea

1. Plants scandent, clinging by means of aerial rootlets; ovary inferior.
   2. Leaves persistent; only fertile flowers present in the inflorescence; petals falling separately. . . . . H. serratifolia
   2. Leaves deciduous; sterile and fertile flowers present in the inflorescence; petals connate and falling together as a cap. . . . . H. anomala
1. Plants erect; ovary either half-inferior or completely inferior.
   3. Inflorescence a conical cluster.
      4. Leaves pinnately lobed; ovary inferior. . . . . H. quercifolia
      4. Leaves not lobed; ovary half-inferior. . . . . H. paniculata
   3. Inflorescence a flat-topped cluster.
      5. Ovary inferior in both flower and fruit.
         6. Bracts broadly ovate to rounded, enveloping the unopened inflorescence, leaving scars on falling; main branches of inflorescence arising from same point of stem-apex in an umbellate fashion; capsules pubescent. . . . . H. involucrata
         6. Bracts lanceolate to narrowly ovate, covering but not enveloping the inflorescence, leaving no scars; main branches of inflorescence not arising from same point at stem-apex; capsules glabrous.
            7. Fertile flowers usually blue; bracts numerous, outer surfaces densely hirsute; inflorescence and adjacent stem pubescent with stiff, upwardly appressed or lax, spreading hairs. . . . . H. aspera
            7. Fertile flowers white; bracts few, outer surfaces with few scattered hairs; inflorescence and adjacent stem pubescent with scattered, upwardly appressed hairs. . . . . H. arborescens
      5. Ovary half-inferior in both flower and fruit. . . . . H. heteromalla
      5. Ovary inferior in flower, half-inferior in fruit. . . . . H. macrophylla

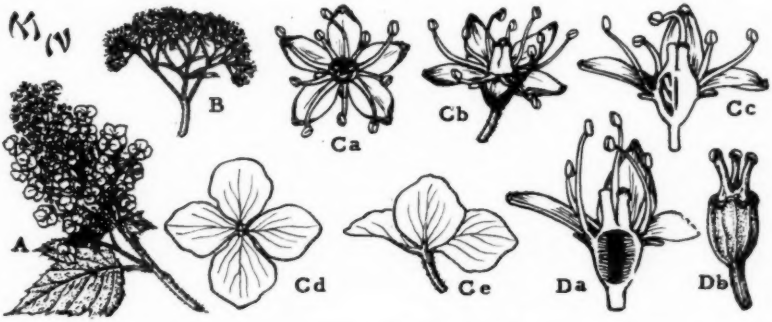

Fig. 47. A, conical inflorescence (H. quercifolia). B, flat-topped (H. arborescens). C, H. heteromalla: a, b, fertile fl., face and side view x 3; c, same, vertical section (half-inferior ovary) x 4; d, e, sterile fl., face and side view x 1. D, H. macrophylla: a, fertile fl., vertical section (inferior ovary) x 4; b, fruit x 2.

Hydrangea quercifolia Bartram, from the southeastern United States, is well characterized by its conical inflorescence and pinnately lobed leaves. The inflorescences contain both fertile and sterile flowers, which are white. The fertile flowers have an inferior ovary, 2, 3, or 4 styles, and stamens which are 3 to 6 mm. long. The sterile flowers with age take on a purplish tinge and the leaves usually turn red or yellow in the autumn before falling. This species is relatively stable and shows little, if any, variation in any of its parts.

Hydrangea arborescens Linnaeus, from the eastern United States, differs from H. quercifolia in its simple leaves and rounded or flat-topped inflorescences. Both fertile and sterile flowers may be present in the inflorescences, although sometimes the sterile ones are absent. The fertile flowers have an inferior ovary, mostly two styles, and stamens which are 1. 5 to 4 mm. long. In this species the kind and amount of pubescence on the lower leaf-surface varies. There are two kinds of hairs which can be readily distinguished by examining the individual hairs under a compound microscope (magnification of about 100 X). The hairs are (1) those which are 1 mm. or less long and 10-25 microns wide and covered with numerous tubercles which give them a roughened appearance, and (2) those which are 1-3 mm. long and 5-20 microns wide and without tubercles or with only a very few scattered ones. Hydrangea arborescens consists of three subspecies, which usually can be distinguished by the appearance of the lower leaf-surface without microscopic examination of the individual hairs. They are as follows:

1. Hydrangea arborescens subsp. arborescens. The lower leaf-surface in this subspecies is green and glabrous, or nearly so. A few stray hairs present along the midvein are of the first kind mentioned above. Its typical form, in which sterile flowers are few or lacking, is not very ornamental and not used in cultivation. More attractive and often seen is the form in which the inflorescences, made up entirely of sterile flowers, are hemispherical and very ornamental. This form, known as H. arborescens grandiflora, occurred originally in the wild, whence it was brought into cultivation.

2. Hydrangea arborescens subsp. discolor (Seringe) McClintock[1]. [H. arborescens var. discolor Seringe. H. cinerea Small, in part. H. arborescens var. Deamii St. John.] In this subspecies the lower leaf-surface is grayish, velutinous, pilose, or tomentose. The hairs, not dense enough to be matted or intertwined, are of the first kind mentioned above. There is also a form of this subspecies in which the inflor-

[1] Miss McClintock's combinations in Hydrangea have recently been published in the Journal of the Arnold Arboretum, Vol. 37, pp. 373-374 (October, 1956). It is expected that the entire monograph will be published next year, 1957, in the "Proceedings of the California Academy of Sciences" [Ed.].

Fig. 48. Hydrangea quercifolia.

escences consist entirely of sterile flowers and which has been introduced into cultivation from the wild. The name H. cinerea var. sterilis has been applied to it.

3. Hydrangea arborescens subsp. radiata (Walter) McClintock. [H. radiata Walter.] The lower leaf-surface in this subspecies is white or, rarely, grayish. Individually the hairs are of the second kind mentioned above. When the lower leaf-surface is white, the hairs are always densely matted to form a tightly intertwined indumentum, and each individual hair is smooth, that is, without tubercles, and 5-10 microns wide. When the hairs are grayish and loosely intertwined, they are 5-20 microns wide and have a few scattered tubercles. The name Hydrangea canescens Kirchner was doubtless given to a plant with such an indumentum.

Hydrangea serratifolia (Hooker & Arnott) Philippi. [H. integerrima (Hooker & Arnott) Engler. H. scandens Poeppig, not Maximowicz nor Rehder.] This climbing Chilean species is the only one of those occurring in Central and South America to have been introduced into cultivation. Its evergreen nature distinguishes it from H. anomala, also a climber and in cultivation. The inflorescences of this species contain only fertile flowers, and in these the ovary is inferior, the styles are usually 3 in number, and the stamens are 3-7 mm. long. The numerous flowers with conspicuous stamens make the inflorescences showy.

Hydrangea anomala D. Don. [H. altissima Wallich. H. petiolaris Siebold & Zuccarini. H. scandens Maximowicz, not Poeppig nor Rehder.] Hydrangea anomala occurs in the Himalayan Mountains of northern India, Bhutan, and Nepal, the mountains of western and central China, Japan, and Dagelet and Quelpaert islands off the south coast of Korea. It is distinguished from H. serratifolia by its deciduous leaves and the presence of sterile flowers in its inflorescences. This species has two characters not found elsewhere in the genus - the petals of the fertile flowers are connate and fall together as a cap, and the seeds are winged. The fertile flowers have an inferior ovary, 2 or 3 styles, and 9-20 stamens which vary in length from 3-5 mm. Hydrangea anomala consists of two subspecies separated by the number of stamens and by the geographical distribution as follows:

1. Hydrangea anomala subsp. anomala. [H. altissima Wallich.] Stamens 9 to 15. Found in the Himalayas and China.

2. Hydrangea anomala subsp. petiolaris (Siebold & Zuccarini) McClintock. [H. petiolaris Siebold & Zuccarini. H. scandens Maximowicz, not Poeppig nor Rehder.] Stamens 15 to 20. Found in Japan and the islands south of Korea.

Both of these subspecies have been introduced into cultivation. Hydrangea anomala, besides being known by the names listed above in synonymy, is often erroneously called Schizophragma hydrangeoides, a quite different Asiatic climber.

Hydrangea paniculata Siebold. This species occurs in southeastern China and Japan, and is the only Asiatic one to have a conical inflorescence. Its simple leaves readily distinguish it from the American H. quercifolia, which has a conical inflorescence but pinnately lobed leaves. Both sterile and fertile flowers are present in the inflorescences of the typical form of H. paniculata. In the fertile flowers the ovary is half-inferior, the styles are 2, 3, or 4 in number, and the stamens are 1.5 to 4.5 mm. long. The filaments are flattened and broadened toward their bases, a character found only in this species and in H. heteromalla. The typical form of this species, having both fertile and sterile flowers, is cultivated less often than the more showy form having all sterile flowers. This latter form, referred to as H. paniculata grandiflora, has come to be known as the "peegee" hydrangea in the United States and Great Britain. Hydrangea paniculata has escaped from cultivation and become naturalized in parts of the eastern United States.

Hydrangea heteromalla D. Don. [H. vestita Wallich. H. vestita var. pubescens Maximowicz. H. Bretschneideri Dippel. H. xanthoneura Diels. H. dumicola W. W. Smith.] Hydrangea heteromalla occurs in the Himalayan Mountains of northern India, Nepal, and Bhutan, the mountains of adjacent southeastern Tibet and northern Burma, and in western to northeastern China. The inflorescence of this species is flat-topped and contains both fertile and sterile flowers. In the structure of its fertile flowers and its fruits this species is indistinguishable from H. paniculata, but these two species may be recognized by the differences in the shape of their inflorescences. Throughout the wide geographical range of H. heteromalla the amount of pubescence on the lower leaf-surfaces varies from a sparsely to a densely tomentose condition, although occasionally the leaves are glabrous. Cultivated specimens, having been introduced from different geographical sources, show variation in this character.

Hydrangea aspera D. Don occurs in the Himalayan Mountains of northern India, Bhutan, and Nepal, the mountains of adjacent southeastern Tibet and northern Burma, and in China, Formosa, Java, and Sumatra. The flat-topped inflorescences contain both fertile and sterile flowers, both of which are often colored pale blue or lavender. In the fertile flowers the ovary is inferior, the styles are 2, 3, or 4 in number, and the stamens are 2 to 7 mm. long. This wide-ranging species varies in the size and shape of the leaves and in the amount of pubescence on the lower leaf-surface. Four subspecies are recognized, all of which have been introduced into cultivation at various times.

1. Hydrangea aspera subsp. aspera. [H. villosa Rehder.] The lanceolate or narrowly ovate leaves are 9 to 24 (rarely 30) cm. long and 2 to 9 cm. wide, and usually two to five times as long as wide, petioles are mostly 1 to 5 cm. long, the pubescence of the lower leaf-surface is velutinous with lax, spreading hairs.

2. Hydrangea aspera subsp. strigosa (Rehder) McClintock. [H. strigosa Rehder. H. aspera var. macrophylla Hemsley. H. longipes Hemsley var. lanceolata Hemsley.] The leaves are more or less of the same shape as in subsp. aspera but tend to be larger, from 5 to 35 cm. long and 2 to 13 cm. wide. The pubescence of the lower leaf-surface, which is strigose with straight, appressed hairs, serves to distinguish it from subsp. aspera.

3. Hydrangea aspera subsp. robusta (Hooker f. & Thomson) McClintock. [H. robusta Hooker f. & Thomson. H. longipes Franchet. H. longipes Hemsley. H. Rosthornii Diels.] The leaves are ovate or broadly ovate, usually cordate, 9 to 22 cm. long, 7 to 13 cm. wide, and usually less than two times as long as wide. The petioles are usually 5 to 17 cm. long. The lower leaf-surface is strigose with straight, appressed hairs, much as in subsp. strigosa.

4. Hydrangea aspera subsp. Sargentiana (Rehder) McClintock. [H. Sargentiana Rehder.] This subspecies is distinguished from the others by the presence of conspicuous, fleshy trichomes, 2 to 5 mm. long, which are interspersed among the hairs of the velutinous pubescence on the stems, lower leaf-surfaces and petioles, and by its vigorous habit and large, broadly ovate leaves, usually 15 to 35 cm. long. Of the four subspecies of H. aspera, this is the only one with a restricted distribution. It is known only from two localities in Hupeh Province in China.

Hydrangea involucrata Siebold is limited in its geographical distribution to Honshu Island in Japan. Because of its similarity, in the structure of the fertile flowers and fruits, to H. aspera, these two species are considered to be closely related. The two species are separated by the shape and number of their floral bracts. In H. involucrata these bracts are few in number and broadly ovate and enclose the unopened inflorescence, whereas in H. aspera the bracts are numerous, lanceolate, and cover (but do not envelop) the unopened inflorescence. Two forms of H. involucrata have been cultivated in Japan, the typical form with both sterile and fertile flowers, and a form with numerous "double" sterile flowers which was named H. involucrata var. hortensis by Maximowicz in 1867. According to Haworth-Booth, this latter form was imported into England in 1906, but it is rarely grown.

Hydrangea macrophylla (Thunberg) Seringe. Because of the adaptability and versatility in cultivation of some forms of Hydrangea macrophylla, this species is the best known in the genus. It is distinguished from the other members of the genus by the position of the ovary in the fertile flowers. In this species the ovary is inferior in flower and becomes half-inferior in fruit, whereas in all other species the ovary is either inferior or half-inferior in both flower and fruit. Hydrangea macrophylla occurs in the eastern Himalayan Mountains in Bhutan and Sikkim, the mountains of northern Burma and western China, and in Japan and Korea. There are four subspecies of H. macrophylla, two from the Asiatic mainland and two from Japan. It is the two Japanese subspecies which are cultivated. Of these, subsp. macrophylla is the more restricted in its distribution, being found only on the coast of central Honshu, on Chiba (Bosu or Boshu) Peninsula, and on the islands of Oshima and Hachijo to the south, while subsp. serrata is found in woodland areas on the four islands of Japan.

Hydrangea macrophylla subsp. macrophylla was described originally as Viburnum macrophyllum, from a Japanese garden plant collected by Carl Thunberg, the Swedish botanist who, as physician to the Dutch East India Company, spent the years of 1775 and 1776 in Japan. During these years Thunberg made a collection of Japanese plants, which formed the basis of his "Flora Japonica," published in 1784. The specimens collected by Thunberg are available for study in the Institute of Systematic Botany of the University of Uppsala, and in 1954 I was able to examine the type specimens of the five species of Hydrangea which Thunberg described in the "Flora Japonica." (Actually, Hydrangea as a genus was not known to Thunberg, and he placed these five species in Viburnum.)

There are two forms of Hydrangea macrophylla subsp. macrophylla, one in which the inflorescence consists of a cluster of fertile flowers surrounded by a few sterile flowers, and the other in which the inflorescence consists entirely of sterile flowers. The form with both kinds of flowers occurs in the wild on the coastal area of central Honshu, whereas the other is the commonly cultivated garden form called "hortensia" in Europe and America. Although introduced into England in 1789 from China, the hortensia had already been in cultivation for centuries in China and Japan.

The origin of the hortensia remained unknown until E. H. Wilson found the form with fertile and sterile flowers growing in the wild in central Honshu in 1917. On his earlier trips to China, Wilson had always looked for a hydrangea which might be considered to be the wild progenitor of the hortensias, but he saw none which suggested this to him until he found the plants on Boshu Peninsula. He recognized their similarity to the garden plants and several years later, after thoroughly considering the question of the origin of the hortensia, published his conclusions. Wilson (1923) considered the

plants from Boshu Peninsula to be the wild prototype of the hortensia, the difference between the wild and the cultivated plants being only the greater number of sterile flowers in the inflorescences of the garden plants. Wilson suggested that these sterile-flowered inflorescences were simply an "anomalous condition" of the wild plant, a condition known to occur in other species of Hydrangea.

Previous to Wilson's observations it had been thought that the hortensia might have had a hybrid origin, but Wilson could see nothing to indicate this. My own conclusions are in agreement with those of Wilson. Recently, Haworth-Booth (1950) has discussed the origin of the hortensias from the standpoint of their being of hybrid origin. His arguments are not based on a thorough knowledge of the botanical characters of the genus and cannot be accepted as valid.

Hydrangea macrophylla subsp. serrata was collected also by Thunberg in Japan and was described as Viburnum serratum in the "Flora Japonica." This subspecies was considered to be a separate species and was known as Hydrangea serrata until the Japanese botanist, Makino, in 1929 reduced it and H. macrophylla to two subspecies of a single species. Hara (1955) recently followed Makino and discussed the nomenclatural problems involved in making the change in status of these two taxa. Subspecies serrata is cultivated occasionally and can usually be distinguished without difficulty from subsp. macrophylla on the basis of the differences in leaf-texture. However, occasional specimens are encountered in which this difference is not clearly marked.

The characters distinguishing these two subspecies are as follows:

1. Hydrangea macrophylla subsp. macrophylla. [Viburnum macrophyllum Thunberg. Hydrangea macrophylla (Thunberg) Seringe. H. macrophylla var. normalis Wilson. H. maritima Haworth-Booth, a new name for the preceding.] Petals 3-4 mm. long; styles in anthesis 2 mm. long; capsules 6-8 mm. long; leaf-length about one and one-half times greater than width, leaf-texture "thick," leaves glabrous and shining.

Hara (1955) designates the two forms of this subspecies as:

forma macrophylla. All flowers sterile in the inflorescences.

forma normalis (Wilson) Hara. Both sterile and fertile flowers present in inflorescences.

2. Hydrangea macrophylla subsp. serrata (Thunberg) Makino. [H. Thunbergii Siebold. H. acuminata Siebold and Zuccarini.] Petals 2-3 mm. long; styles in anthesis 1-2 mm. long; capsules 2.5-6 mm. long; leaf-length one and one-half to four times greater than width, leaf-texture "thin," leaves more or less pubescent and dull in appearance.

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"Baileya" readers who are especially interested in the cultivated members of the Gesneria family may remember H. E. Moore's article on Sinningia eumorpha and S. Maximiliana in the December 1954 number (vol. 2, pp. 138-140). In this article he told of the introduction from Brazilian tropics into American gardens of the former species, which had not been named or described until it came to his attention through Mr. Robert Wilson of Fantastic Gardens, Miami, Florida. Material of it was later sent to Mr. B. L. Burtt, specialist in the Gesneriaceae at the Royal Botanic Gardens, Edinburgh.

It will be of interest to American gesneriad enthusiasts that this species is now illustrated by a full page color plate in "Curtis's Botanical Magazine" (t. 278), from an excellent water color by Miss Ann V. Webster. Accompanying the plate is a four-page article by Mr. Burtt, describing not only the new species, with an account of its culture by Mr. L. Stenning of Kew, but also its relation to other species of Sinningia and a discussion of the interrelationships of Sinningia, Gloxinia, and related genera.

As has been pointed out in this journal before (vol. 2, p. 18, March 1954), plantsmen building libraries of the finest horticultural literature consider "Curtis's Botanical Magazine" (published by the Royal Horticultural Society of London) among the finest and most valuable of their accessions. It is the oldest horticultural journal, now in its 171st volume. Two numbers are published annually (price, $12.50 a year) and four comprise a volume. Each number contains color plates, black and white drawings, and detailed botanical and horticultural discussions of usually new or not previously illustrated garden plants. Where cost prevents private ownership, one should try to ensure its being available in the nearest public library.

G. H. M. L.

A Short History of the Poinsettia

Mary H. Moon

Few plants are so widely grown as the poinsettia. According to the 1950 census, 2, 356 establishments in the United States sold 3, 707, 324 plants at a wholesale value of $4, 715, 209, in that year, and this seems a good indication of its popularity. Yet, while so many grow and recognize it, few know its interesting history and botany.

This striking plant became a Christmas favorite in North America soon after it was introduced into cultivation there in 1828. It is one of the few important ornamentals that was known to plantsmen before it was known to botanists. First propagated by a horticulturist named Robert Buist, it was sold for five years under the name he gave it, Euphorbia Poinsetta [sic]. Buist obtained the plant by chance. He had moved from Fairmount to Philadelphia in 1828, to start a nursery and seed company. One of his first visits there was to the botanic garden of his friend, John Bartram, who had received a box of unusual plants from Mexico that very day. Interested in the striking red bracts of these shrubs, Buist arranged to get some cuttings.

The plants were of poinsettia, sent to Bartram by Joel Roberts Poinsett, the first Minister to Mexico from the United States. Poinsett, a statesman from South Carolina, interested in improving our relations with Central and South America, was in addition an ardent horticulturist and plant collector. Wherever he traveled, he collected plants that seemed desirable for cultivation in the United States. The poinsettia, which Buist named to honor his services to American gardeners, was one of the most valuable of those Poinsett introduced.

Robert Buist's plants bore bracts forming a brilliant "crown" 22 inches across. This astonished the European botanists and friends to whom Buist sent cuttings and a descriptive manuscript in 1833. One of these men was Dr. Robert Graham, Regius Keeper of the Royal Botanic Garden, Edinburgh, Scotland, from 1820-1845. After successfully growing the plant to the flowering stage at the botanic garden in 1836, Graham published an account of the plant, treating it as representing a new genus because of the exceptional character of the bracts. He named it Poinsettia pulcherrima, saying, "There can be no doubt it forms a new generic type.... I have dedicated it, if not to its original discoverer, at least to one who has first brought it into cultivation and into general notice among botanists."

Graham did not consider Poinsett the discoverer because there was a specimen of poinsettia in Willdenow's herbarium in Berlin, and this Graham cited in his paper. The name written on the herbarium sheet by Willdenow was Euphorbia pulcherrima, but this name had never been published. Graham was evidently unaware that another botanist had studied the herbarium specimen several years earlier and had published a name for the plant. This had been done in 1833 by Johann Klotzsch, who had worked over material that Baron von Karwinski of Munich had brought from Mexico. Included in this Mexican material was a specimen of poinsettia which Karwinski had labelled Euphorbia heterophylla. Klotzsch referred to the specimen marked E. pulcherrima in Willdenow's herbarium, as well as to two others he considered identical with it: E. coccinea, no. 2958, and E. diversifolia, no. 2957, all collected by von Humboldt in Mexico. Klotzsch adopted the first of the three names when he published the species in 1834 in the "Allgemeine Gartenzeitung." There he reported that Willdenow's son had grown the plant from seed the year before and had flowered it.

Evidently Klotzsch's publication of E. pulcherrima was not generally noticed. Poinsettia pulcherrima of Graham, published in England and Scotland two years later, was adopted by Buist in his American poinsettia trade, and poinsettia continues as the common name for the species.

In 1840 the poinsettia was given still another name. Antonio Bertoloni published it as Euphorbia erithrophylla, placing the other names in synonymy. The specimen he studied was collected in Guatemala by Joachim Velazquez, who called it "Euphorbio hermoso." Nevertheless, it is Klotzsch's Euphorbia pulcherrima that has prior claim as the valid botanical name for the plant.

Few of our commonly cultivated plants possess such interesting details of floral structure as does the poinsettia. It is a pity that these parts are so small as to require a lens to properly observe and appreciate them. In the poinsettia it is not the showy colored bracts that comprise the flowers, nor is it the small green and red cup-shaped structures from which the stamens protrude. Each of the several cup-like structures situated at the center of the whorl of bracts actually contains many flowers. Further, each flower is of a single sex; within each "cup" there is usually a single female (or pistillate) flower and several male (or staminate) flowers.

Botanists term the cup-like structure a cyathium. It is believed to have been formed by the marginal fusion of many tiny bracts. On one side of it there is a yellow, viscid nectar gland, the origin and significance of which is a mystery. As the male and female flowers mature, each protrudes from the mouth of the cyathium, with the pistillate flower usually overtopping the anther-tipped male flowers.

The question may be asked why these are called separate flowers, instead of being treated as male and female elements of a single flower. Ordinarily, a flower consists of an outer whorl of usually green sepals that form the calyx, an inner whorl of usually colored petals that form the corolla, and, within these whorls (often referred to as two floral envelopes), the stamens and the pistil.

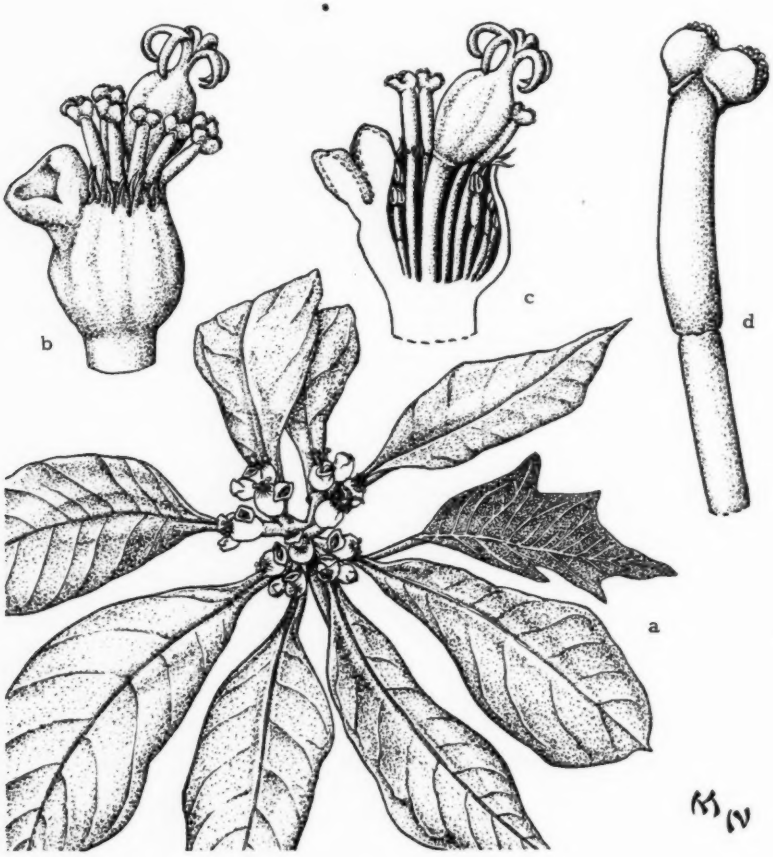

Fig. 49. Euphorbia pulcherrima, the Poinsettia: a, colored bracts and inflorescence; b, a single cyathium, exterior view x 2 1/2; c, cyathium in vertical section, showing the individual pistillate flower and staminate flowers x 2 1/2. d, a staminate flower x 10.

In the family Euphorbiaceae, to which the poinsettia belongs, there are genera in which the individual flowers are showy and do possess these readily recognized components. However, in the evolution of flowering plants it sometimes has happened that floral parts have been lost or greatly reduced in size or function - just as has the appendix in man. Such loss and reduction are believed to have occurred in the genus Euphorbia, to which the poinsettia belongs. In this genus the sepals and petals of the male flowers have been reduced to tiny bristles or have been lost altogether, and the stamens reduced in number until only one remains in each flower (the presence of a conspicuous joint marks the point where the filament or stalk of the stamen is attached to its pedicel). The long-pedicelled pistil, the female element, is all that remains of what once undoubtedly was a much more conspicuous, solitary flower. The cyathium itself may be thought of as the product of the reduction of a branch-system, the branches having been reduced to the point of oblivion, so that all that remain are the bracts, now fused into a cup-like envelope surrounding the remains of the once more showy flowers.

Evidence that these changes have taken place is found not only in studies of other species of the genus Euphorbia itself, but in studies of the situation in other genera of the Euphorbia family. Further evidence is available in studies of the internal anatomy of the floral parts. The present cyathium and its male and female flowers, then, though apparently simple structures, have probably been reduced to this condition over the geologic ages from ancestral structures that were much more like our conventional concept of flowers.

Many cultivars of poinsettia are grown today. The earliest of these were given Latin epithets. In cv. 'Plenissima' the cyathia are few and the bracts numerous, making the center of the "crown" fuller and higher than in the typical form of the species. This "double" form was discovered near an Indian village in the state of Guerrero, Mexico. Introduced to North American gardens in 1872, it is valued for its novelty but is not so popular as the "single" forms. Robert Buist's sale of this plant is reportedly the first such transaction made by ocean telegraph. It is also reported that later a New York florist paid $1,000 for a plant of this cultivar.

The white-bracted form is cv. 'Alba' (sometimes listed also as 'Albida'), introduced in 1835. The cv. 'Rosea', with pink bracts, is also grown, but neither of these is as popular as are the red-bracted cultivars. Those with pink bracts have arisen as chimeras - spontaneously, as do mutations - from normally red-bracted shrubs. Plants with white bracts may be formed in the same way, or may be seed mutations grown from the red form.

Most of the cultivars marketed today were perfected by Mr. Paul Ecke, the leading poinsettia grower, of Encinitas, California. The red-bracted 'Barbara Ecke Supreme' is the most popular for

greenhouse and potted plants. Mr. Ecke reports that over sixty percent of all the potted poinsettias he grows are of this variety. The 'Improved Albert Ecke', also red, is second in popularity, and 'Indianapolis Red' is third. In the southern states, where ornamental poinsettias are grown out-of-doors, the double 'Henrietta Ecke' is the most popular. This sport occurred in 1927 and is named after Mr. Ecke's mother. Of the white varieties, Mr. Ecke reports that his 'Ecke White' is the best seedling for greenhouse culture.

The 'New Pink' is also a seedling, with somewhat larger bracts than the earlier 'Pink'. 'St. Louis' is a red sport of this same 'Pink', but has been almost discontinued. 'Mrs. Paul Ecke', 'Ruth Ecke', and 'Oak Leaf' are also being discontinued.

Although poinsettia is the common name for all these cultivars in the United States, Bailey reported other names for the plant: Easter flower, Christmas flower, Lobster flower, and Mexican flame-leaf. In Central and South America it has many more names, flor de Nochebuena being most common. Standley reports that, in the Mexican states, it is variously called Santa Catarina, paño de Holanda or paño holandés, cuitla-xochtil, flor de fuego, Nochebuena, bandera, bebeta, and flor de Santa Catarina. It is pastora or pastores in Costa Rica and Nicaragua; and simply Pascuas in the Philippines.

Rarely found in the wild state, it is commonly grown around Mexican Indian homes and is used there for Christmas decorations. The natives also make a dye and coloring agent from the bracts and bark, and prepare a poultice from the leaves for treatment of syphilis and skin diseases.

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Book Reviews

"Snowdrops and Snowflakes," by F. C. Stern. 128 pp., with 4 color plates, 11 half-tone plates, 20 line figures, and a map. The Royal Horticultural Society, London. 1956. Price, postpaid to U. S. : $3.81.

Col. F. C. Stern, of Highdown, Goring-by-Sea, Sussex, is well known as a serious horticulturist who appreciates the value of the information to be gained from a botanical study of garden plants. In 1946, the Royal Horticultural Society published the authoritative "Study of the Genus Paeonia" which he wrote in collaboration with J. C. Sealy and other botanists. This past summer, the Royal Horticultural Society has published another book from his pen, based on manuscript material left by the late E. A. Bowles. Col. Stern was again assisted by various British botanists. This latest contribution is entitled "Snowdrops and Snowflakes, A Study of the Genera Galanthus and Leucojum."

In content, "Snowdrops and Snowflakes" is both interesting and informative, at least to a select audience. Col. Stern has done us all a service by digging out a good deal of historical matter dealing with the botanical and horticultural knowledge of these plants. Though this reviewer has not used them, the keys to the species of the two genera seem to be clear, while the individual specific descriptions are as full as one could wish. Many of the taxa discussed are illustrated by clear and attractive line drawings provided by Margaret Stones.

English book reviewers have been commenting adversely on the high price of American books. "Snowdrops and Snowflakes" is a good illustration of what they mean. The Royal Horticultural Society, and Spottiswoode, Ballantine & Co., Ltd., have produced a book of 128 pages (7 1/4 x 9 1/2) with twenty, mostly full-page text figures, eleven half-tone plates, and four full-page color plates. The text is set in a relatively large type and is both pleasant to look at and easy to read. All this has been done for only $3.81, delivered by mail. I doubt that this could be matched in this country.

G. P. DeW.

"Chromosome Botany," by C. D. Darlington. 186 pp., with 36 text figures and 17 tables. George Allen and Unwin Ltd., London. Price: 16 shillings. Also: The Macmillan Co., New York. Price: $2.75.

There has long been a need for a clear and simple exposition of the impact which modern genetical knowledge has made on our conception of plant systematics and evolution. Dr. C. D. Darlington, Professor of Botany in the University of Oxford, has provided us

with such an exposition in his recently published "Chromosome Botany."

Dr. Darlington is a geneticist (using this term in a broad sense) of some considerable stature. A perusal of his book indicates that he not only has a grasp of his own field, but that he has a happy facility with the English language as well. Unfortunately, the distinction between brilliant writing and exposition of fact is not always kept in mind. Such a book as this, since it is a popular exposition, demands that much of the information be supplied in the form of generalities. Such generalizations are very useful tools when they are based on demonstrable fact. But generalizations become dangerous and misleading when they leave the realm of fact and enter the realm of opinion and prejudice.

Part I of "Chromosome Botany" admirably demonstrates the author's knowledge of his field and his command of the art of exposition. Part II, entitled "Plants in Groups," while written in the same compelling and lucid manner, reveals that the author is not well acquainted with fields of botany outside his own.

The author begins his second part with a specious discussion of "Species and Systematics." He reveals a profound, though I fear common, ignorance of the history, philosophy, and technique of systematic botany. The implication, given on page 29, that the majority of systematic botanists of the past have not regarded the species as an interbreeding population is simply not true. Most competent systematists and taxonomists, from (and before) Linnæus to the present day, have regarded the species as an interbreeding population. True, until 1860 the majority, if they were bothered by the question at all, would probably have subscribed to the doctrine of divine creation. Few students, I think, considered the species as invariable (that thesis was more vehemently argued by certain "modern" cyto-taxonomists) but rather extrapolated from their certain knowledge of men, domestic animals, and cultivated plants to assess the amount of morphological variability that one might reasonably expect to find within the limits of a "species." Species remain, as they always have been, groups of more or less structurally similar individuals, whose morphological similarities indicate that they probably do or can interbreed.

Professor Darlington is confused about the use of the nomenclatural type (p. 31 et seq.). From (and before) the time of Linnæus, the description of any taxon has generally been drawn up from the totality of the knowledge of the describer. This knowledge might be gained, as it was in the case of Linnæus, from studying plants in cultivation, or in the wild. It might be supplemented or surplanted by more or less extensive suites of herbarium material and/or printed discussions or illustrations. The accuracy of the description depends upon the amount of knowledge available, and the ex-

perience of the student. In any case, one or more dried samples were, and are, customarily kept in the collection of the describer to act as a standard of reference for the application of the name. Unlike the standard yard or the standard meter, a nomenclatural type is not regarded as representing an average or a standard around which the other individuals of the taxon may be expected to group themselves in a regular fashion. The nomenclatural type is simply one individual, from a group of indefinite size and of a limited structural variation, which serves to identify the name given to the group. Since the beginning of the present century, it has been more or less generally customary to indicate one specific specimen as the "type." This does not, however, limit the description of the species, which is based, as always, on the totality of knowledge about it at any given moment of time.

With the older systematists "type" was a word which indicated the "Commonest form." In the case of floras with which the individual was personally acquainted, this might well be the true case. In the case of exotic floras the "type" was either the form which was most commonly in herbaria, or it might be a form in cultivation. In no case, I think, was the type considered to be anything more than the form which was best known. The inference that the best-known form of the species was also the original form of the species was probably frequently drawn - it is not significantly different from the present day ecologico-genetic idea that the most widespread form is the most primitive. The two ideas are at least equally fallible.

Our modern conception of a nomenclatural type is not much more than fifty years old and is part and parcel of the attempt to give names as much precision as possible.

On page 34 Professor Darlington takes the systematist to task for not knowing the chromosome number of his "type" specimen. We know, from information supplied by Prof. Darlington in another publication, that individuals representing about 15,000 species of angiosperms and gymnosperms have had their chromosomes counted. Analyzing the data further, we know that of this total number only about 1,700 species are reported to have more than one chromosome number. This may well represent an expression of our ignorance - but it seems to indicate that within a species the chances are 7 to 1 that the chromosome number will be stable. It would be nice, to be sure, if we knew the chromosome number of our herbarium material, but it does not seem that the available evidence indicates, as Prof. Darlington suggests, that our ignorance is catastrophic.

The balance of the book is equally fallible. A detailed exposition of demonstrable errors might be useful for those unacquainted with the fields of paleobotany, morphology, and systematics - but

unfortunately would take up more space than the rebutal is worth. Two random examples, however, will be taken as illustration.

> "A single gene may shift a plant, so far as external form is concerned, from one natural order to another." P. 80.

One would certainly like to have examples of this. In the only case which has come to my attention, and has been carefully analyzed, that of Roxira serpentina (Am. Nat. 81: 118-121, 1947), an estimated 10 - 20 pairs of genes are involved in a change of only tribal and/or generic rank. Just what is meant by a "natural order" is not clear - but any historical definition known to me indicates a change of greater magnitude than this. If such changes as this are demonstrable, as Darlington implies, macro-evolution ceases to be a possibility and becomes a probability.

> "... in the Gymnosperms many chromosome complements have probably kept the same chromosome number since the Paleozoic period." P. 104.

So far as I am aware, no living genus of gymnosperms antedates the Mesozoic. I know of no factual demonstration of the mechanisms by which genera are originated. We certainly have no chromosome counts of fossil material. On this same subject, Darlington himself says (p. 102): "... we need not suppose that an animal whose external form, as shown by fossil remains, has been unchanged since the Cambrian period has kept its chromosomes and genes unchanged ..." One wonders what may be the inherent difference between plants and animals - and on what facts this statement is based. One can only conclude that "Chromosome Botany," aside from an initial discussion of the chromosomes themselves, is a treacherous and dangerous bit of literature: treacherous, because too much of it has no basis in demonstrable fact; dangerous, because the prestige of the author and the engaging manner in which the book is written will give these inaccuracies a wide audience. One must conclude that, in the main, the publication of this book has seriously damaged the scientific standing of evolutionary studies.

G. P. DeW.

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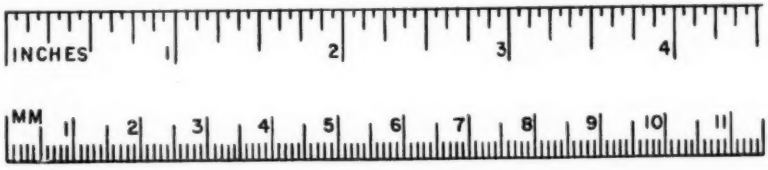
ABBREVIATIONS USED IN BAILEYA

ann.	annual	dm.	decimeter	lf.	leaf
bien.	biennial	fl.	flower	lft.	leaflet
br.	branch	fls.	flowers	lvs.	leaves
brt.	branchlet	flt.	floret	mm.	millimeter
caps.	capsule	fr.	fruit	per.	perennial
cl.	clone	ft.	foot	segm.	segment
cm.	centimeter	hort.	horticultural	st.	stem
cv.	cultivar	in.	inch	sts.	stems
diam.	diameter	infl.	inflorescence	var.	variety

METRIC - ENGLISH EQUIVALENTS (approximate)

6 mm. - 1/4 in.	10 cm. - 4 in.	10 mm. - 1 cm.
12 mm. - 1/2 in.	1 dm. - 4 in.	10 cm. - 1 dm.
25 mm. - 1 in.	3 dm. - 1 ft.	10 dm. - 1 meter
2.5 cm. - 1 in.	10 dm. - 1 yd.	
5 cm. - 2 in.	1 m. - 39 in.